APPENDIX D

BIOLOGICAL EVALUATION

COMMENCEMENT BAY, WASHINGTON
WASSER/WINTER AND NURSERY
SITE HABITAT RESTORATION PROJECTS

BIOLOGICAL ASSESSMENT

FOR COORDINATION WITH THE
NATIONAL MARINE FISHERIES SERVICE
U.S. FISH AND WILDLIFE SERVICE

PREPARED FOR:
COMMENCEMENT BAY NATURAL RESOURCE TRUSTEES

PREPARED BY:
ADOLFSON ASSOCIATES, INC.

EXECUTIVE SUMMARY

In compliance with the Section 7(c) of the Endangered Species Act (ESA), this Biological Assessment (BA) evaluates the potential impacts to listed species resulting from construction and rehabilitation of estuarine wetlands habitat at the Wasser/Winter and Nursery sites in Commencement Bay, Washington. The Commencement Bay Natural Resource Trustees (Trustees) propose to re-create previously lost intertidal habitat on Hylebos Waterway, near Tacoma, for a variety of plants and animals, providing particular benefit for juvenile salmonids.

This BA will be used in informal consultation with the Trustees and US Fish and Wildlife Service and the National Marine Fisheries Service.

Project Site Description

The Wasser/Winter and Nursery sites are adjacent to the Hylebos Waterway where the original tidelands have been filled to accommodate industrial activities. Both sites are characterized as highly to moderately disturbed, and do not provide optimum habitat for aquatic or terrestrial species.

Project Description

The projects will provide approximately 2.41 acres of intertidal habitat by removing existing fill material to create permanently flooded backwater pools, salt water marshes and tideflats. Estuarine vegetation will be planted on gently sloping surfaces tied to the same elevation as the historical tideflats.

Affected Species

Five species provided protection under the ESA are cited as possibly present in the vicinity of Hylebos Creek and Hylebos Waterway: humpback whale (*Megaptera novaengliae*), leatherback sea turtle (*Dermochelys coriacea*), Steller sea lion (*Eumetopias jubatus*), bald eagle (*Haliaeetus leucocephalus*), and Puget Sound Evolutionarily Significant Unit (ESU) chinook salmon (*Oncorhynchus tshawytscha*). Additionally, this BA considers potential impacts to Puget Sound coastal bull trout (*Salvelinus confluentus*), and Puget Sound/Straight of Georgia ESU coho salmon, proposed and candidate species, respectively, under ESA provisions.

An analysis of the proposed habitat rehabilitation project, including construction sequences and habitat safeguards, concludes that these projects may affect, but are not likely to adversely affect, Puget Sound ESU chinook, bald eagles, coastal bull trout, and Puget Sound/Straight of Georgia coho salmon.

Humpback whales, leatherback sea turtles and Steller sea lions do not normally inhabit the project vicinity, and will realize no effect from the action.

Table of Contents

1.0 INTRODUCTION

The Commencement Bay Natural Resource Trustees (Trustees) include Federal, State, and Tribal entities responsible for evaluating injury to the Commencement Bay environment, and restoring the environment with damage settlement funds. The Trustees are involved in a Commencement Bay Natural Resource Damage Assessment (CB/NRDA) program in Tacoma, Washington. National Oceanic and Atmospheric Administration (NOAA) serving as the lead agency for the Trustees, contracted with Ridolfi Engineers Inc (Ridolfi) to perform restoration design services.

Adolfson Associates Inc. (Adolfson) prepared this Biological Assessment (BA) under subcontract to Ridolfi, on behalf of the Trustees, for two habitat restoration projects on the Hylebos Waterway: The Wasser/Winter site and the Nursery site (Figure 1)[1]. The projects would re-create previously lost intertidal habitat for a variety of plants and animals, providing particular benefit for juvenile salmonids including chinook salmon, which is listed as "threatened" under the Endangered Species Act (ESA). Section 7 of the ESA requires federal agencies to consult with the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS) if they conduct, authorize, or fund an action that may impact a listed species or designated critical habitat.

1.1 STUDY PURPOSE

This BA was prepared to facilitate coordination between the action agency [US Army Corps of Engineers (COE)], and NMFS and USFWS, jointly referred to as the Services. NMFS regulates federally-listed threatened and endangered marine wildlife and anadromous fish stocks. Threatened and endangered terrestrial wildlife, plants, and inland fish stocks are under the jurisdiction of the USFWS. The purpose of this BA is to determine the need for consultation or conference with the Services by providing information regarding the proposed habitat rehabilitation, site specific information, and a discussion of the effects on federally-listed, proposed, and candidate species

1.2 BACKGROUND INFORMATION

Project Name:	Wasser/Winter and Nursery Site Habitat Restoration Projects, Commencement Bay, Washington
Project Location:	Tacoma, Washington (Pierce County) Sections 26 and 36, Township 21 North, Range 3 East
Project Proponent:	National Oceanic and Atmospheric Administration NOAA Damage Assessment and Restoration Center NW 7600 Sand Point Way NE Seattle, WA 98115
Contact:	Jennifer Steger, NOAA Phone: (206) 526-4363

[1] A third site (Meeker) had been considered previously, but was found unsuitable for restoration due to high wave energy and the likelihood of only marginal habitat improvement. That site is not considered in this BA.

Proposed timing or schedule:	Work will begin no earlier than Spring 2000. In-water work will occur no earlier than July 2000. All work will be completed in 45 days or less, inside a three-month period.
Project Engineer:	Ridolfi Engineers, Inc. 1411 Fourth Ave., Suite 770 Seattle, Washington 98101
Contact:	Colin Wagoner, P.E. Phone: (206) 682-7294
Preparer:	Adolfson Associates, Inc. 5309 Shilshole Avenue NW, Suite 200 Seattle, Washington 98107
Contact:	Dave Wortman/Brian Bigler Phone: (206) 789-9658

2.0 DESCRIPTION OF THE PROJECT AREA AND HABITAT

This section identifies the project sites and describes current environmental conditions. The two sites are described separately because they are located approximately 2.3 miles apart. Both sites are on the Hylebos Waterway, an industrial waterway created by dredging operations beginning about 100 years ago. Dredging converted the delta of Hylebos Creek and the associated mudflats and salt marshes into a shipping channel. Dredge spoils were used to create upland industrial areas adjacent to the waterway.

2.1 WASSER/WINTER SITE

The Wasser/Winter site is located in the City of Tacoma between Marine View Drive and the upper turning basin of the Hylebos Waterway, on land owned by the Port of Tacoma (Figure 1). The site is adjacent to the tidally influenced, channelized, lower reach of Hylebos Creek where the creek drains into the Hylebos Waterway. Upland areas of the project site encompass a flat area vegetated with grasses and shrubs. The site itself extends northeast from the centerline of the creek to a fence that borders an asphalt cap/parking area, and seaward to the pierhead line in the turning basin. A log storage yard borders the site to the southwest across Hylebos Creek, and State Route (SR) 509 crosses Hylebos Creek immediately southeast of the site. The site dimensions are approximately 1,000 by 100 feet, totaling about 2.3 acres. Soils are characterized as sandy/silt dredge fill overlying pre-development tideflats.

Upstream of the SR-509 bridge is a two-acre Washington State Department of Transportation (WSDOT) compensatory mitigation site comprised of constructed intertidal marsh surrounded by riparian vegetation (WSDOT, 1994). Further upstream of the WSDOT site, Hylebos Creek contains riparian and riverine habitat for a variety of migratory and resident fish, birds, and small mammals.

Historically, Hylebos Creek has been a prolific salmon-spawning stream (King County and Federal Way, 1990). Salmon runs have declined in part due to urbanization of spawning areas. As of 1990, the watershed was approximately 50 percent developed, which has increased peak flows, degraded the riparian zone, and adversely affected water quality (King County and Federal Way, 1990). Localized areas of suitable spawning habitat exist, however, particularly on the West Branch of Hylebos Creek.

In the 1970's and 1980's the Puyallup Tribe stocked Hylebos Creek with chinook, chum and coho (Ladley, personal communication, 1999). Although these programs have been discontinued, vestigial populations enter the creek annually to spawn. The near-shore area and Hylebos Waterway are used extensively as rearing and feeding habitat by numerous marine species, and as a migratory pathway for salmonids.

At the project site, Hylebos Creek is a straight channel with steep banks, and is tidally influenced. At low tide [below +1 feet above mean lower low water (MLLW)], freshwater flows in a pool and riffle configuration in the channel. Typically, however, the tide is high enough to give this portion of Hylebos Creek the appearance of a tidal slough (Figure 2).

The substrate of Hylebos Creek in the project reach is primarily soft mud with minor components of gravel and larger cobbles. The overlying mud/silt substrate was removed at several points and the underlying materials examined. This qualitative examination revealed apparent anaerobic conditions and no benthic (bottom-dwelling) or epibenthic organisms.

There are no barriers to upstream fish migration at the project site. Log rafting activity in the Hylebos Creek proximity may disturb salmon migration.

Water Quality and Quantity in Hylebos Creek

Hylebos Creek is classified by the Washington Department of Ecology (Ecology) as a class A water body. Hylebos Creek streamflow data for the period of May 1995 through May 1999 were obtained from a U. S. Geological Survey (USGS) gauging station approximately 1.8 miles upstream from Hylebos Waterway. The entire Hylebos Creek Watershed drains an area of approximately 18 square miles, 16.8 square miles that are upstream of the USGS gauging station. Streamflow ranged from 3.5 cubic feet per second (cfs) to 367 cfs, averaging 29 cfs for the two-year period.

Quantitative measurements of turbidity are not available for Hylebos Creek near the project site. Qualitative turbidity observations were made during site inspections where Fife Ditch enters Hylebos Creek approximately 300 feet upstream from the project site. At that location, Fife Ditch is noticeably turbid and degrades Hylebos Creek water quality. A joint study by King County and the City of Federal Way found elevated levels of fecal coliform bacteria, phosphorous, nitrogen, suspended solids, copper, lead, mercury, and zinc in samples collected from Hylebos Creek (King County and Federal Way 1990).

2.2 NURSERY SITE

The Nursery site is located waterward of Marine View Drive near the Hylebos Waterway west end, on property held in Trust for the Puyallup Tribe (Figure 1). The site is approximately 360 by 80 feet, or 0.66 acres. The upland portion of the site was constructed from a gravelly sand fill material and slopes gently toward the south. Upland vegetation consists of trees, blackberry bushes, and grasses. A strip of intertidal marsh vegetation approximately three to four feet wide is located near the mean higher high water (MHHW) line. Low-gradient mudflats that provide habitat for benthic (bottom-dwelling) organisms of particular importance to shorebirds and juvenile salmonids are located below MHHW. The site contains several pilings, logs, and riprap indicative of previous log storage activities in the area (Figure 2).

The project site vicinity includes narrow intertidal and subtidal margins broken by commercial marinas and log storage areas. To the north, and across Marine View Drive, is a woody, steep-sloped area. East and west of the site are additional intertidal and mudflats that have been designated as natural resource conservancy areas by the Puyallup Tribe. The project site is situated in a portion of Commencement Bay containing the largest area of undisturbed mudflats, and is an important migratory route for salmonids, waterfowl, and shorebirds.

Water Quality and Quantity at the Nursery Site

Hylebos Waterway is classified by Ecology as a Class B water body. There are no barriers to migrating fish at the Nursery site, and the mudflats drain on a daily basis with the tides.

Surface water enters the Nursery Site through two discrete outfalls. Both outfalls direct stormwater through the project area and discharge into the intertidal mudflats, one directly through a 12-inch concrete pipe, and the other through a 12-inch concrete pipe and into a short, narrow, incised channel flowing into the mudflats. The westernmost outfall discharges runoff from Marine View Drive and the steep, forested slopes north of the site. The eastern outfall discharges runoff from Marine View Drive, runoff from the slopes north of the site, and runoff from paved commercial areas east of the site along East 11th Street.

An analysis of the quantity and quality of water being discharged to the Nursery Site from the two outfalls is currently being conducted by the City of Tacoma (1999). Based on data from the first two sampling events, the estimated rate of flow from the western outfall is 15 gallons per minute (gpm) in May 1999 and 10 gpm in July 1999. The estimated rate of flow from the eastern outfall was 17 gpm in both May and July 1999.

Water quality, including turbidity, tests are not available for the Nursery site, though outfall waters appear clear at low flow conditions.

3.0 DESCRIPTION OF THE PROPOSED ACTIONS

This section reviews the relevant information regarding the habitat rehabilitation projects. Adolfson reviewed ninety-percent complete design drawings to obtain information on project

elements. Additionally, the project proponents and engineer were consulted to provide additional detail as required.

3.1 WASSER/WINTER SITE

The project goal is to restore and enhance estuarine habitat, maximize residence time for juvenile salmonids and provide landscape connectivity with the WSDOT mitigation site immediately upstream. A salt marsh will be planted at an elevation near MHHW on gently sloping surfaces and will be similar in height to the historical tideflats to the extent feasible.

The Wasser/Winter site will provide approximately 2.3 acres of intertidal habitat by removing 17,700 cubic yards (cy) of existing upland fill material, to create permanently flooded backwater pools and intertidal salt marshes (Figure 3). Specific construction techniques for this project will be developed by the contractor; however, based on past experience with these types of projects the work will progress in the following manner:

1. Installation of a silt fence and bale dikes on or near the project boundary;
2. Removal of 17,700 cy of existing upland fill;
3. Grading the excavated surface to construct backwater pools;
   (Backwater pools will not be exposed to tidal inundation until just before project completion. Fill removal below MHHW will likely require dewatering to allow equipment access)
4. Placing a growth media (top soil) to encourage plant growth, and
5. Revegetating with native salt marsh and riparian plants and installing several pieces of large woody debris. Approximately 1.5 acres of the site will be graded and/or excavated to restore the habitat.

Heavy equipment used for construction will probably include backhoes, front-end loaders, bulldozers, and dump trucks. No pilings will be installed as part of the project. Neither drilling equipment nor blasting will be used during the project.

3.2 NURSERY SITE

The project goal is to create intertidal salt marsh habitat to replace the industrially filled upland areas. Approximately 0.66 acres of intertidal habitat will be restored by grading an upland area north of the existing vegetation line and by replanting an intertidal vegetation community (Figure 4). Runoff from the hillside on the north side of Marine View Drive will be intercepted and routed through the project site in a dendritic channel pattern. Topsoil will be placed in excavated areas to encourage plant growth. A berm will be constructed next to Marine View Drive and planted with riparian plants to discourage trespassers from entering the site.

Specific construction techniques for this project will be developed by the contractor; however, based on past experience with these types of projects, the project proponents and project engineer anticipate that work will progress in the following manner:

1. Installation of a silt fence and straw bale dikes on or near the project boundary;
2. Removal of 2,000 cy of upland fill from the existing upland areas;
3. Demolition of a portion of the stormwater system where it discharges to the mudflats;

4. Construction of small channels to redirect the stormwater through the site in dendritic channels;
5. Placing topsoil to support growth of intertidal and riparian vegetation; and
6. Replanting with native salt marsh and riparian plants. Approximately 0.66 acres will be graded and/or excavated to restore the habitat.

Heavy equipment used for construction will probably include backhoes, front-end loaders, bulldozers, and dump trucks. No pilings will be installed as part of the project. Neither drilling equipment nor blasting will be used during the project.

3.3 TIMING/CHRONOLOGY OF SPECIFIC CONSTRUCTION ACTIONS

A three-month window is anticipated for all construction at both the Wasser/Winter and Nursery sites, which is expected to include no more than 45 days of actual construction. The timing for in-water work will be determined by the Hydraulic Project Approval (HPA) issued by the Washington Department of Fish and Wildlife (WDFW). The expected in-water work window for this project will be between June 15 and August 31 when low tides occur during daylight hours and the most opportunity exists to minimize in-water work. This timing is also consistent with the in-water construction season for Commencement Bay (June 15 through the winter to March 14).

4.0 STATUS OF THE SPECIES AND CRITICAL HABITAT

Information provided by NMFS (1999a, 1999b) and USFWS (1999) indicates that the project will occur within the general range of the following species:

Common Name	Scientific Name	Regulatory Agency/Status*
Humpback whale	*Megaptera novaengliae*	NMFS/ Endangered
Leatherback sea turtle	*Dermochelys coriacea*	NMFS/ Endangered
Steller sea lion	*Eumetopias jubatus*	NMFS/ Threatened
Bald eagle	*Haliaeetus leucocephalus*	USFWS/ Threatened
Chinook salmon	*Oncorhynchus tshawytscha*	NMFS/Threatened
Bull trout	*Salvelinus confluentus*	USFWS/ Proposed Threatened
Coho salmon	*Oncorhynchus kisutch*	NMFS/Candidate

There are no records of humpback whales, leatherback sea turtles, or steller sea lions occurring in the Hylebos Waterway.

* See Glossary for category definitions

4.1 HUMPBACK WHALE (*Megaptera novaengliae*)

The most recent documented sighting of humpback whales in Puget Sound occurred in 1999 near Seattle (Calambokidis, personal communication, 1999). Such sightings are rare, however, occurring about every one to two years. The occurrence of humpback whales in Commencement Bay is more rare: about once every three to four years.

Due to the proximity of industrial activity, lack of prey and insufficient water depth, the possibility of humpback whales entering the Hylebos Waterway is effectively zero.

4.2 LEATHERBACK SEA TURTLE (*Dermochelys coriacea*)

Leatherback sea turtles are seen infrequently on the outer coast of the Olympic Peninsula. The closest documented observation to Commencement Bay occurred at Port Angeles, more than 100 miles north (McAllister, personal communication, 1999).

Due to the lack of documented sightings of leatherback sea turtles in southern Puget Sound, the possibility of an encounter in Hylebos Waterway during the proposed habitat restoration projects is effectively zero.

4.3 STELLER SEA LION (*Eumetopias jubatus*)

The Steller sea lion ranges from the Channel Islands of southern California, north to the Bering Sea. There are no regular patterns of occurrence or migration corridors within Puget Sound, but individual animals have been sighted within groups of California sea lions in the Straits of Juan de Fuca and on navigation buoys south of Commencement Bay (Norberg, personal communication, 1999).

There is no habitat suitable to Steller sea lions within the Hylebos Waterway. While the opportunity to feed on salmon migrating through the project area is not zero, the likelihood that Steller sea lions would occur in the project vicinity is discountable.

Based on the low likelihood of occurrence, and the absence of potential impact mechanisms, the habitat rehabilitation projects at the Wasser/Winter and Nursery sites are expected to have no effect on humpback whales, leatherback sea turtles, or Steller sea lions, or their critical habitat. Therefore, these species are not addressed further in this BA.

4.4 PUGET SOUND ESU CHINOOK SALMON (*Oncorhynchus tshawytscha*)

Chinook salmon have a historic range from the Ventura River in California to Point Hope, Alaska in North America, and from Hokkaido, Japan to Anadyr River in Russia. The Puget Sound Evolutionarily Significant Unit (ESU) chinook salmon was listed as a threatened species on March 16, 1999. The ESU includes "all naturally spawned populations of chinook salmon from rivers and streams flowing into Puget Sound including the Straits of Juan De Fuca from the Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington" (NMFS, 1999a).

Spring and fall run chinook spawn in the Puyallup River above river mile (RM) 10.5, and in the White River and it's tributaries (WDFW, 1994). Puget Sound ESU Chinook are listed as threatened under the ESA in Washington State, and have been identified as inhabiting the project areas (NMFS, 1999).

Hylebos Creek Salmon

Although chinook salmon do not occur naturally in Hylebos Creek, the Puyallup Tribe has attempted to introduce fall run chinook, and have augmented the creek with chum and coho salmon (Ladley, personal communication, 1999). This program was discontinued in recent years, and no attempt has been made to quantify the vestigial populations. Hylebos Creek salmon migrate through the Hylebos Waterway as both adults and juveniles, though are not afforded specific protection under the ESA.

Impacts to these populations are expected to be minimal as the work window occurs outside the known adult (October December) and juvenile (spring) migration periods (Ladley, personal communication, 1999).

Critical Habitat

There is no critical habitat designated for Puget Sound ESU Chinook Salmon. Critical habitat is currently proposed by NMFS, though not yet granted specific protection. Proposed critical habitat includes all marine, estuarine and river reaches accessible to chinook salmon in Puget Sound, including Commencement Bay.

Life History

Chinook require varied habitats during different phases of their life cycle. Spawning habitat typically consists of riffles and the tailouts of pools with clean substrates dominated by gravel located in the mainstem of rivers and large tributaries. Adult summer and fall chinook salmon in the Puyallup Basin spawn in freshwater streams in the late summer and fall, and fry emerge in the late winter and early spring. Juvenile chinook rear from three months to two years in the lower mainstem of rivers before entering the estuary and salt marshes. Chinook generally migrate to salt water as smolt in the spring and summer, and thereafter spend from two to four years feeding in the North Pacific Ocean before returning to spawn (WDFW, 1994).

Environmental Baseline

Wasser/Winter Site

The mouth of the Hylebos Creek is tidally influenced and does not provide chinook salmon spawning habitat. Additionally, the substrate in the Hylebos Creek is primarily silt and mud underlain with black-stained substrates that appears anoxic and unsuitable for chinook salmon spawning. There is little cover or other habitat suitable for foraging juvenile chinook salmon.

Nursery Site

There is no habitat in the Nursery Site vicinity considered suitable to adult chinook salmon. The proposed habitat rehabilitation work will occur above MHHW, in habitat where juvenile chinook

salmon would not likely occur. Nevertheless, the many stranded logs and other materials on the mudflats would likely provide cover for feeding and migrating juveniles while the area is inundated by high tide, and the mudflats provide a source of benthic prey.

4.5 COASTAL BULL TROUT (*Salvelinus confluentus*)

The historical distribution of bull trout extends from northern California to Alaska. In Washington, bull trout are found throughout coastal and inland streams and lakes (WDFW, 1998), and are proposed for listing by the USFWS as threatened. Bull trout in the Puyallup Basin are considered coastal bull trout.

Critical Habitat

The USFWS has not established or identified critical habitat for coastal bull trout.

Life History

Bull trout have a complex life history with two primary life history types: a resident form and a migratory form. Bull trout considered migratory may be stream dwelling (fluvial), lake-dwelling (adfluvial), or ocean- or estuarine-dwelling (anadromous) (USFWS, 1998). Individuals of each form may be represented in a single population, though, migratory populations may dominate where migration corridors and subadult rearing habitats are in good condition (USFWS, 1998). Most inland populations of bull trout are either fluvial or adfluvial, migrating from larger rivers and lakes to spawn in smaller tributary streams in August through October (Wydoski and Whitney, 1979). Bull trout spawn in streams with clean gravel substrates and cold (<9°C) water temperatures (USFWS, 1998). Spawn timing is relatively short, occurring from late October through early November. Redds are dug by females in water eight to 24 inches deep, in substrate gravel 0.2 to 2 inches in diameter (Wydoski and Whitney, 1979), and emergence generally occurs in the spring. Bull trout are opportunistic feeders, consuming fish in the water column and insects on the bottom (WDFW, 1998).

Bull trout have been found in the Puyallup River, though in low numbers and only in the upper reaches (above river mile 43). Little is known of this species occurrence in Commencement Bay, though it is conceivable that the anadromous form could migrate through, or rear within, Hylebos Waterway.

Environmental Baseline

Low stream temperatures and clean substrates are essential features of bull trout habitat. This species is most commonly associated with pristine or only slightly disturbed basins (USFWS, 1998), conditions that do not exist in Hylebos Waterway and Hylebos Creek.

4.6 BALD EAGLE (*Haliaeetus leucocephalus*)

The occurrence of bald eagles in Puget Sound and the Tacoma area has been documented since pre-settlement times (Stalmaster, 1987). Eagle populations have decreased within the region because of hunting and the widespread use of DDT, but their numbers have been increasing since the early 1970's. The species is currently under consideration for de-listing.

Critical Habitat

No critical habitat has been established or identified for bald eagles.

Life History

Bald eagles generally perch, roost, and build nests in mature trees near water bodies where they spot prey while soaring or from perches (Ehrlich et al., 1988). Stalmaster (1987) reports that over 50 percent of an eagle's diet comes from fish, 25 percent from other birds, and 15 percent from mammals, although they will also feed on carrion (Stokes and Stokes, 1989).

Bald eagles are both residents in, and migrants through, Pierce County where populations are usually highest in January, as birds that had moved north to feed in late summer return to the region. Bald eagles breed in mid- to late-winter, usually returning to one of several nests located within an established nesting territory (Stalmaster, 1987). As bald eagles are primarily fish eaters, they usually nest within one mile of open water, where their home range can extend up to eight miles. Eggs laid in March or April will hatch within one and a half months, and the young eagles fledge in mid-summer (August).

Environmental Baseline

Hylebos Waterway and Hylebos Creek provide foraging habitat for both nesting and wintering bald eagles, though sightings are uncommon. There are no large trees at the Wasser/ Winter site, though there are several large cottonwood trees in and around the Nursery site (Figure 2). Nonetheless, there are no eagle nest sites, perches or roosts known to occur within one mile of the project (WDFW, 1999). A transient bald eagle may occur within the vicinity of the Hylebos Waterway during project construction, but eagle use in the project area is unlikely due to the high level of ambient industrial-based noise.

4.7 PUGET SOUND/STRAIGHT OF GEORGIA ESU COHO SALMON (*Oncorhynchus kisutch*)

On July 25, 1995, NMFS determined that listing was not warranted for Puget Sound/Straight of Georgia ESU coho salmon. The ESU, however, is designated as a candidate for listing due to concerns over specific risk factors. The ESU includes all naturally spawned populations of coho salmon from drainages of Puget Sound and Hood Canal, the eastern Olympic Peninsula (east of Salt Creek), and the Strait of Georgia from the eastern side of Vancouver Island and the British

Columbia mainland (north to and including the Campbell and Powell Rivers), excluding the upper Fraser River above Hope (NMFS, 1999).

As a candidate species, no specific protections are afforded under the ESA, and section 7 consultation or conference with NMFS is not required for anticipated impacts to these species. Summary information for this candidate species is included herein in the event these candidate species become "listed" or "proposed" before project completion.

Critical Habitat

No critical habitat has been proposed for Puget Sound/Straight of Georgia ESU coho salmon.

Life History

Coho salmon occur in most major river basins around the Pacific Rim from central California to Korea and northern Hokkaido, Japan. Adult coho salmon spawn in freshwater streams in the late fall and early winter. Coho typically spawn in low gradient riffles with clean substrates ranging from pea-sized gravel to orange-sized cobbles. Rearing juveniles prefer off-channel pools with complex cover including both large and small woody debris. Juvenile coho rear in freshwater for a year to 18 months, and smolts migrate to the ocean in the spring of their second year. Most male coho, and all female coho, spend from 16 to 20 months rearing in the ocean and return to spawn in fresh water as three-year old adults. The spawner distribution of the Puyallup coho salmon stock includes Hylebos Creek (WDFW, 1994).

Environmental Baseline

Natural coho populations in the Puget Sound/Strait of Georgia ESU have been influenced by hatchery introductions and harvests focused on exploiting hatchery augmented stocks. Coho escapement data are the most comprehensive in Puget Sound, and indicate that the Puyallup Basin coho salmon stock in the Puget Sound/Strait of Georgia ESU is depressed (WDFW, 1994).

Wasser/Winter Site

Hylebos Creek upstream of the SR 509 bridge provides coho salmon rearing habitat, though the project site and the vicinity of the Hylebos Waterway near the creek mouth provides little cover or other suitable habitat. The substrate in Hylebos Creek downstream of the SR 509 bridge is primarily sandy silt with some smaller gravel, unsuitable for coho salmon spawning. A qualitative survey found the mud/silt substrate underlain by anaerobic conditions, and no benthic prey items in the project reach of Hylebos Creek and Hylebos Waterway. Additionally, this portion of the creek is brackish and not suitable spawning habitat for Coho.

Nursery Site

There is no habitat in the Nursery Site vicinity considered suitable to adult coho salmon. The many stranded logs and other materials on the mudflats would likely provide cover, and mudflats

provide benthic prey items for feeding and migrating juveniles while the area is inundated by high tide.

5.0 EFFECTS OF THE ACTION

5.1 DIRECT EFFECTS

Wasser/Winter Site

Habitat at the Wasser/Winter site has been extensively modified and simplified due to past industrial and commercial activity. The stream channel has been straightened; fill material has raised the ground surface and the site largely overtaken by non-native plant species. Work on Wasser/Winter site rehabilitation will include three main project elements that will result in direct effects to the project area:

1) Removal of the existing upland fill materials from an area of approximately 2.0 acres;
2) Grading the site to tie into the upstream rehabilitated projects, constructing a number of backwater pools; and
3) Revegetating with native salt marsh and riparian plants to improve habitat.

Clearing vegetation from the existing fill materials will temporarily eliminate riparian vegetation adjacent to Hylebos Creek. Grading and soil movement will be necessary to construct the improved habitat, including several permanently flooded backwater pools and tideflats. Work will not require the diversion or dewatering of Hylebos Creek Clearing, fill removal, grading, and the preparation of the backwater areas will require the use of heavy machinery above and below the MHHW, and may require dewatering. To avoid excessive siltation, backwater pools will not be connected to Hylebos Creek until just before project completion. The connections will be made at low tide when the site is physically inaccessible to fish. Additionally, conservation measures including limiting work to the summer months and erosion control best management practices, as outlined in Section 8.0, will be used to reduce impacts. National Marine Fisheries Service Habitat Pathways for Hylebos Creek will be restored, enhanced, or unchanged (Table 1).

Nursery Site

Upland portions of the Nursery site contain fill materials that were used to raise the ground surface. Additionally, remnants of a structure built from pilings and riprap are present below MHHW. Work on the Nursery site habitat rehabilitation will include three main project elements that will result in direct affects to the project area:

1) Removal of upland fill materials from approximately 0.66 acres of the existing upland area;
2) grading to construct a dendritic channel system to distribute fresh water on the site; and
3) replanting with salt marsh and riparian vegetation.

Construction will temporarily eliminate riparian vegetation adjacent to MHHW. Grading and soil movement will be necessary to construct the improved habitat. Clearing, grading, and the